

PONY

سلسلة كتب الأستاذ

Computer and

ICT

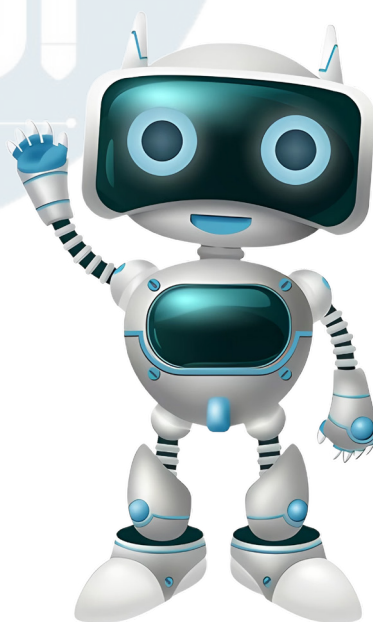
Monthly Revision of February and March

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Summary

of Chapter 2

Lesson 1 Artificial Intelligence Applications

- » **Narrow AI:** It focuses on specific tasks, such as face recognition or language translation.
- » **General AI (GAI):** It can perform any human tasks, think, innovate, and adapt.
- » **Super AI (SAI):** It is the most advanced; it can solve complex problems and discover new things.

Key Points:

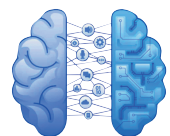
» Applications of AI in Daily Life: سلسلة كتب

- 1 **Personal Assistant:** Like Siri or Alexa, They use AI to understand and perform commands.
- 2 **Smart Games:** Video games use AI to make games fun and challenging.
- 3 **Smart Cars:** Self-driving cars are enabled by AI.
- 4 **Digital Doctors:** AI aids in faster and more accurate medical diagnoses. سلسلة كتب
- 5 **Instant Translator:** AI translates languages in real-time.
- 6 **Smart Shopping:** AI suggests products based on previous purchases.



» Fields of Artificial Intelligence:

- 1 **Machine Learning:** AI learns from data and experiences.
- 2 **Natural Language Processing (NLP):** AI understands, interprets, and speaks human language.
- 3 **Computer Vision:** AI analyzes and understands visual information.





- ④ **Robotics:** AI-powered robots perform various tasks.
- ⑤ **Expert Systems:** AI solves complex problems and make decisions.
- ⑥ **Deep Learning:** AI learns complex tasks using neural networks.

» Creating Intelligent Models with Teachable Machine:

- **Teachable Machine:** It is a tool for creating models to recognize images, sounds, and movements.
- **Model Building Training:** Teaching AI by showing it examples is similar to teaching a child.

Lesson 2 Sensors

Definition:

- » **Sensors:** They are devices that sense changes in the environment and convert them into signals for machines to understand and make decisions.

Key Points:

» How Sensors Work:

- ① **Sensing:** They capture information (heat, light, and sound).
- ② **Signal Conversion:** They convert information into electrical signals.
- ③ **Transmission:** They send signals to display results or perform operations.

» Importance of Sensors for Robots:

- **Function:** Sensors act as the “senses” of robots, helping them see, hear, sense, and touch.

» Types of Robotic Sensors:

- ① **Distance Sensors:** They measure the distance to avoid collisions.
- ② **Light Sensors:** They adapt to changing light conditions.
- ③ **Sound Sensors:** They respond to voice commands.
- ④ **Motion Sensors:** They detect movement and direction changes.



5 **Special Sensors:** They measure temperature and humidity.

» Examples of Devices Using Sensors:

1 **Vacuum Cleaner Robot:** It avoids obstacles.

2 **Surgical Robot:** It uses precise sensors to perform surgeries.

3 **Self-Driving Cars:** They see the road and make decisions.

» Types of Distance Sensors:

1 **Ultrasonic Sensors:** They emit high-frequency sound waves to measure distance.

– **Examples:** Vacuum cleaner robots, parking systems, and fluid level measurement

2 **Laser Rangefinders:** They emit laser beams for high accuracy.

– **Examples:** 3D laser scanners, ground scanning systems, and industrial measurement

3 **Visible Light Sensors:** They use digital cameras to analyze images.

– **Examples:** Self-driving car cameras, industrial vision systems, and augmented reality systems

4 **Infrared Sensors:** They emit infrared rays, then receive the returning rays.

» They are widely used in consumer electronics.

– **Examples:** Remote controls, and non-contact thermometers

5 **Time of Flight Sensors:** They measure the light pulse travel time.

– **Examples:** 3D sensors, and motion tracking systems

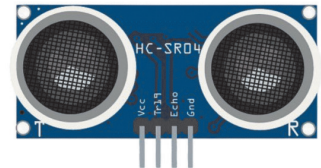
» Factors for Choosing Sensors:

1 **Required Range:** The maximum distance to measure

2 **Required Accuracy:** The measurement precision needed

3 **Operating Environment:** Conditions like lighting, temperature, and humidity.

4 **Cost:** Device and installation expenses.





»» Daily Applications of Sensors:

- 1 **Smartphones:** Taking pictures, adjusting lighting, determining locations
- 2 **Modern Cars:** Measuring speed, warning of collisions, assisting in parking
- 3 **Smart Homes:** Motion sensors for automatic lighting
- 4 **Phone Microphone:** Converting sound to electrical signals
- 5 **Motion Sensors in Games:** Detecting phone tilts
- 6 **Touch Screen:** Sensing finger touches

Lesson 3 Robots

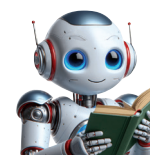
Definition:

- »» **Robot:** It is a device programmed to automatically perform specific tasks, capable of moving, sensing, and interacting with its surroundings.

Key Points:

»» Types of Robots:

- 1 **Industrial Robots:** They are used in factories for precise tasks, e.g., car production.
- 2 **Home Robots:** They are found in homes, e.g., Roomba for cleaning floors.
- 3 **Medical Robots:** They assist in surgeries with high accuracy.
- 4 **Educational Robots:** They are used in schools to teach programming, e.g., LEGO Mindstorms.



»» Robot Components:

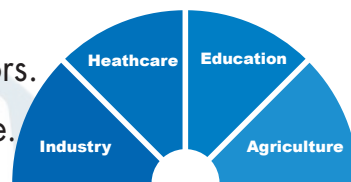
- 1 **Structure:** It is the main part carrying all components, made of materials like metal, plastic, or carbon.
- 2 **Sensors:** They are the senses of the robot, e.g., sound sensors and cameras.
- 3 **Motors:** They move parts of a robot, so it can move and execute commands, e.g., electric motors and pneumatic motors.



- ④ **Controller:** It is the “brain” of the robot, processes data and issues commands.
- ⑤ **Power Source:** It can be batteries, solar cells, or direct electrical power source.
- ⑥ **Software:** It makes the robot “smart,” includes algorithms for responses.
- ⑦ **Communication Tools:** They interact with users or other robots, e.g., Bluetooth and Wi-Fi.

» Areas of Use of Robots:

- ① **Industry:** They improve productivity, reducing errors.
- ② **Healthcare:** They assist in surgeries and patient care.
- ③ **Education:** They provide interactive learning.
- ④ **Agriculture:** They are used in precision farming to increase crops and reduce waste.



» Challenges:

- ① **Safety:** The need to ensure the safety of robots during work.
- ② **Employment:** Concerns that they can replace human labor.
- ③ **Ethics:** Impact on society.

» Benefits:

- ① **Increased Efficiency and Productivity:** They can do continuous work without fatigue or interruption.
- ② **High Accuracy and Reduced Errors:** They are precise in tasks, like surgeries and electronics assembly.
- ③ **Safety and Security:** They can perform dangerous tasks and handle heavy weights and hazardous materials.
- ④ **Adaptability and Diversity:** They perform various tasks efficiently. Ex: home robots and educational robots
- ⑤ **Reduced Costs:** They provide long-term cost savings by reducing human labor or errors, and achieving accuracy.
- ⑥ **Contributing to Development:** They encourage technological advancements, e.g., space exploration and medical research.



Lesson 4 Scratch

Definition:

- » **Scratch Program:** It is a visual and easy-to-use educational tool for learning programming through games, animations, music, and more.



Key Points:

» Scratch Program Features:

- 1 **Simple Interface:** It uses and orders visual blocks to form programs.
- 2 **Educational:** It is designed to teach basic programming concepts in a fun way.
- 3 **Free:** It is available for download from its official website for free.
- 4 **Creative Thinking:** It develops skills in creative thinking and problem-solving.
- 5 **Problem-solving Skills:** It solves problems in a logical way.
- 6 **Collaboration:** It enhances teamwork skills.
- 7 **Foundation:** It provides a strong start for learning more complex programming languages.
- 8 **Sharing:** Its projects can be shared with others.

» Program Interface:

- **Menu Bar**
- **Command Blocks Area**
- **Script Area:** It collects programming sections.
- **Stage Area:** It shows project results.
- **Sprite Object**
- **Sprites Area:** It contains the project's objects.

» Coordinates:

- **Determine Coordinates:** X=..... (horizontal), Y=..... (vertical)
- **Change Coordinates:** Drag and drop the sprite to a new position.



» Implement the project:

- To execute the project, click on the icon .
- To stop the execution of the project, click on the icon .

» Saving the Project:

- File Menu: Choose "Save to your computer".
- The file extension is **Sb3**.

Lesson 5 Sprites Area in Scratch

Definition:

» **Sprites Area:** It contains the sprites used in the project.

Key Points:

» Sprites Area Features:

- 1 **Name:** It is modified by clicking and renaming.
- 2 **Location:** It determines the sprite's position (X, Y values).
- 3 **Direction:** It changes the sprite's movement direction.
- 4 **Visibility:** It shows or hides the sprite.
- 5 **Size:** It changes the sprite's size.
- 6 **Delete:** It removes the sprite.
- 7 **Add:** It is used to choose a new sprite.

» Adding a New Sprite:

- Choose Sprite: Select Basketball.
- Remove: Delete the cat sprite.

» Project 2: Moving the Ball

- **Objective:** To move the ball randomly, make a sound, repeat 10 times.

» Steps:

- 1 **Motion:** Choose "Go to random position".
- 2 **Sound:** Choose "Play sound".
- 3 **Control:** Choose the "Repeat" command.
- 4 **Events:** Choose the "When Clicked" command.



»» Project 3: Spaceship

– **Objective:** To move a spaceship randomly, make a sound, change size, repeat 5 times, start from (0, 0).

– **Steps:**

- 1 **Insert Sprite:** Add Rocketship.
- 2 **Remove:** Delete the cat sprite.
- 3 **Background:** Choose "Space".

»» Square Drawing Project:

- 1 **Open Project:** Start a new project.
- 2 **Select Pen:** Drag the "pen" block to start drawing.
- 3 **Set Color and Size:** Use "Set Pen Color to" and "Set Pen Size to" blocks.
- 4 **Move the Pen:** Use "Go to x:y:" blocks to draw lines.
- 5 **Repeat the Steps:** Draw more lines to form shapes.

»» Drawing a circle:

»» Use the "Repeat" block to repeat the process of drawing short lines at different angles.

»» Notes:

- 1 **Drawing Shapes:** Set start and end points for lines.
- 2 **Adding Details:** Add features like eyes, mouth, and ears.

February and March Model Exams

Model Exam

1

1 Put (✓) or (X):

- 1 Artificial intelligence can learn new things slowly. ()
- 2 Self-driving cars rely entirely on artificial intelligence. ()
- 3 The first step to operate the sensor is signal conversion. ()
- 4 The design of the structure affects the robot's weight and mobility. ()
- 5 The student needs scratch program to writing a lot of complex code. ()
- 6 In the Scratch program Students face difficulty sharing projects with others. ()
- 7 Scratch uses a visual interface based on blocks. ()

2 Choose the correct answer:

- 1 Artificial intelligence can solve the problems that it is difficult for Humans to solve it easily and discovering new things we never imagined before:
- a. General.
 - b. Narrow.
 - c. Super.
 - d. Precise.
- 2 Sensors help robots on
- a. Teaching it new languages.
 - b. interacting with environment.
 - c. Increase its size.
 - d. Slowing down its operations.
- 3 is a type of sensor used to avoid obstacles.
- a. Light sensors
 - b. Sound sensors
 - c. Distance sensors
 - d. Heat sensors

- 4 Robots assist in dangerous tasks such as
 a. handling hazardous chemicals b. handling heavy weights
 c. cleaning the house d. both a and b
- 5 Scratch helps students
 a. make remote controls
 b. learn the principles of programming
 c. 3D scanning d. all of them
- 6 The "Sprite" in Scratch represents a/an
 a. background b. object or character
 c. command block d. none of them
- 7 To execute the project, click on the icon
 a.  b. 
 c.  d. 
- 8 is the main part that carries all the components of the robot.
 a. Motor b. Structure
 c. Sensor d. Controller

Model Exam

2

1 Put (✓) or (X):

- 1 Artificial intelligence is a branch of computer science. ()
- 2 Light sensors are useful in underwater environments. ()
- 3 Light sensors helps cars determine the distance to other vehicles. ()
- 4 Robots are limited to working in factories only. ()
- 5 The Scratch program helps students learn the basics of programming. ()
- 6 To save project from the list File choose Save to your computer. ()
- 7 Smart home lighting system it uses sensors to turn on the lights when someone enters the room. ()

2 Choose the correct answer:

- 1 Like Siri or Alexa uses artificial intelligence to understand and execute your commands:
 - a. A personal assistant.
 - b. Interpreter.
 - c. Smart Shopping.
 - d. Natural language.
- 2 From The common applications For sensors Using Infrared rays in
 - a. Smartphones.
 - b. Remote controls.
 - c. Vacuum cleaners.
 - d. 3D scanning.
- 3 devices capture information from the surrounding environment and convert it into electrical signals.
 - a. Sensors
 - b. Strings
 - c. Touch Screen
 - d. Robotic Arm
- 4 In production lines, robots can perform repetitive tasks accurately which leads to
 - a. slow production
 - b. decreased efficiency
 - c. increased efficiency and productivity
 - d. lack of development
- 5 The sprites used in a Scratch project appear in the area.
 - a. Sensors
 - b. Bluetooth
 - c. Strings
 - d. Sprites
- 6 In Scratch, to add a new object, press on
 - a. Start
 - b. Choose Sprite
 - c. Rename Sprite
 - d. none of them
- 7 A power source for robots is the:
 - a. sensor
 - b. motor
 - c. batteries
 - d. software
- 8 The smart vacuum cleaner is a type of robot used for floor cleaning.
 - a. industrial
 - b. home
 - c. agricultural
 - d. medical

Model Exam

3

1 Put (✓) or (X):

- 1 Artificial intelligence is only one type. ()
- 2 Laser distance sensors are considered accurate because they Use Laser beams. ()
- 3 Motors used in robots are Electric motors and pneumatic motors. ()
- 4 Scratch is considered a difficult-to-use educational tool. ()
- 5 Scratch offers a very wide range of programming ideas. ()
- 6 Robots do not need to use software in their work. ()
- 7 To be able to move the object, we use the Motion Blocks from the Area Blocks. ()
- 8 Robots can improve productivity and reduce human errors in industry. ()

2 Choose the correct answer:

- 1 The X and Y values in Scratch represent the
 - a. size of the sprite
 - b. direction of the sprite
 - c. location of the sprite
 - d. color of the sprite
- 2 In scratch, result of the work or project appears in the area.
 - a. Programming Script Area.
 - b. Stage area
 - c. Blocks area.
 - d. Creatures Sprites.
- 3 is an example of General Artificial Intelligence (GAI).
 - a. A chess-playing robot
 - b. A robot that mimics humans
 - c. Siri
 - d. None of the previous
- 4 The first step in the operation of the sensor is
 - a. Transmitting
 - b. Sensing
 - c. Transduction

- 3 Narrow AI focuses on performing
- a. multiple tasks b. specific tasks
c. human-like tasks d. all tasks
- 4 are commonly used in remote controls.
- a. Ultrasonic sensors b. Infrared sensors
c. Light sensors d. Motion sensors
- 5 To save your project in scratch, select "Save to your computer" from the menu.
- a. file b. edit
c. delete d. share

3 • Choose the correct answer from the list below::

(Teachable Machine _ Infrared _ Home _ GAI _
 سلسلة كتب الأستاذ
 Neural networks _ Sensors)

- 1 sensors are used to measure body temperature without the need for direct contact.
- 2 is a tool that helps create AI models to recognize images, sounds, and movements.
- 3 The smart vacuum cleaner (Roomba) is a type of robot.
- 4 AI that can perform any task a human can do is called
- 5 Deep learning depends mainly on

Model Exam

5

1 Put (✓) or (X):

- 1 Artificial intelligence is used only in the video game industry. ()
- 2 Control unit processes data collected by the sensors and Commands are issued to the engines. ()
- 3 In the Scratch program the code displays in the stage area. ()
- 4 In order to move the object we use the group Motion from Command Groups Area and select Blocks Area. ()
- 5 To display "Hello" on the platform, From the Looks category, select the command: say "Hello. ()

2 Choose the correct answer: سلسلة

- 1 A new background for the project is inserted by pressing
 - a. Script Area
 - b. Stage
 - c. Choose Sprite
 - d. Choose a Backdrop
- 2 If the movement of sprite is done quickly, the command used is from Control Blocks:
 - a. Wait.
 - b. Repeat.
 - c. Forever.
 - d. Else.
- 3 is a branch of computer science.
 - a. Scratch
 - b. string
 - c. Artificial intelligence
 - d. motors
- 4 In which environment are light sensors useful ?
 - a. In dark rooms
 - b. In noisy factories
 - c. In places with variable lighting conditions
 - d. In underwater environments

5 is a field of AI that involves learning from mistakes.

- a. Machine Learning
- b. Natural Language Processing
- c. Computer Vision
- d. Robotics

3 Complete the Following Statements:

1 focuses on specific tasks, such as face recognition or language translation

2 The is the "brain" of the robot.

3 The file extension for Scratch projects is

4 sensors detect movement and changes in directions.

5artificial intelligence can solve problems that are difficult for humans to solve easily and discover new things we never imagined before.



Answers

MODEL (1)

- 1 1 X 2 ✓ 3 X 4 ✓
5 X 6 X 7 ✓

- 2 1 c 2 b 3 c 4 d
5 b 6 b 7 d 8 b

MODEL (2)

- 1 1 ✓ 2 X 3 X 4 X
5 ✓ 6 ✓ 7 ✓

- 2 1 a 2 b 3 a 4 c
5 d 6 b 7 c 8 b

MODEL (3)

- 1 1 X 2 ✓ 3 ✓ 4 X
5 ✓ 6 X 7 ✓ 8 ✓

- 2 1 c 2 b 3 b 4 b
5 b 6 c 7 b

MODEL (4)

- 1 1 ✓ 2 ✓ 3 X
4 X 5 ✓

- 2 1 b 2 b 3 b
4 b 5 a

- 3 1 Infrared
2 Teachable Machine
3 Home 4 GAI
5 Neural networks

MODEL (5)

- 1 1 X 2 ✓ 3 X
4 ✓ 5 ✓

- 2 1 d 2 a 3 c
4 c 5 a

- 3 1 Narrow AI 2 controller
3 sb3 4 Motion
5 Super